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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,918	08/02/2000	Juliet C. Kraal	200-0646	7908

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	9

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/630,918	KRAAL ET AL.	
	Examiner	Art Unit	
	Thomas Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 August 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6,7,8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-20 have been examined.

2. Claims 1-20 have been examined and rejected.

Objections

Abstract

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The abstract is more than 150 words.

Drawings

4. The drawings filed are objected to by the Draftsperson under 37 CFR 1.84 or 1.152 for the following reasons:

> Margins: The sheets must not contain frames around the sight (i.e., the usable surface), but should have scan target points (i.e., cross-hairs) printed on two cater-corner margin corners. Each sheet must include a top margin of at least 2.5 cm. (1 inch), a left side margin of at least 2.5 cm. (1 inch), a right side margin of at least 1.5 cm. (5/8 inch), and a bottom margin of at least 1.0 cm. (3/8 inch), thereby leaving a sight no greater than 17.0 cm. by 26.2 cm. on 21.0 cm. by 29.7 cm. (DIN size A4) drawing sheets, and a sight no greater than 17.6 cm. by 24.4 cm. (6 15/16 by 9 5/8 inches) on 21.6 cm. by 27.9 cm. (8 1/2 by 11 inch) drawing sheets.

Figures 1 and 2 top left margins are unacceptable.

> Character of lines, numbers, and letters. All drawings must be made by a process, which will give them satisfactory reproduction characteristics. Every line, number, and letter must be durable, clean, black (except for color drawings), sufficiently dense and dark, and uniformly thick and well defined. The weight of all lines and letters must be heavy enough to permit adequate reproduction. This requirement applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views. Lines and strokes of different thickness may be used in the same drawing where different thickness have a different meaning.

The lines, numbers and letters for figures 1-5 are not uniformly thick and well defined, clean, nor durable.

who is

Figure 1: As a stand-alone document, items 62 and 42 are unclear as to ~~whose~~ doing the monitoring?

Figure 4: As a stand-alone document, the information is unclear. Annotation of phrases to each piece of information is necessary.

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following features canceled from the claim must be shown:

> **Claim 7:** *A method as set forth in claim 1, wherein the scale ratio is a ratio between a predetermined dimension of the evaluator and a predetermined dimension of a member of a target population.* None of the drawings state verbatim the previous information.

No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Socks (5,831,584) et al in view of Walker et al. The numbers in parenthesis represent locations of information in both Socks and Walker.

8. Socks discloses an item and process in the genre of virtual reality by sensing for simulation two virtual objects: a person's hand and an automobile.

The person wears goggles, which project an image of a virtual vehicle, as well as a virtual image of the person's hand and any objects, such as coffee cups, that the person may grasp in his hand. This type of simulator composes of a person sitting in a virtual reality vehicle simulator; exercising typical physical movements inside a vehicle: depressing actual brake and accelerator pedals, A position sensing system senses the position of a marker that is attached to a marked portion of the person's hand, e.g., the back of the hand. The person may be tasked to manipulate a virtual object, e.g., a virtual pushbutton, with a contact portion of his hand, e.g., the index finger. To calibrate the distance between the marked and contact portions so that a virtual image of the hand accurately may be displayed, a control surface is positioned adjacent the seat such that the person can manipulate the control surface. Based on the manipulation, the distance between the marked and contact portions is determined, thus calibrating the size of the virtual hand to accurately model the person's actual hand. (Socks: Abstract)

As shown in FIG. 1, the person (16) can view a visual display element, such as goggles (26) which are worn by the person (16). In accordance with the present invention, the goggles (26) are suitable virtual reality goggles known in the art which include left and right two- or three-dimensional visual display screens which respectively present to the person's left and right eyes a virtual image of the actual space (12). It is to be understood that the virtual image of the space (12) includes images of the actual components in the space (12), as a person sitting in the seat (14) would actually see the components.

Also, the virtual image of the space (12) that is presented by the goggles (26) includes images of simulated objects that are in the virtual space but not in the actual space, as the objects are intended to be seen by a person sitting in the seat (14) were the objects actually present at their simulated location in the space (12). Additionally, the image of the virtual space (1212) presents an image of a virtual hand 1818 that is located relative to the virtual space (1212) analogously to where the actual hand 18 is located relative to the actual space (12). In accordance with vehicle simulation, the person (16) can attempt to manipulate one or more of the virtual objects shown on the goggles (26), and in so doing, observe the image of his virtual hand (1818).

(Socks: Figures 1-3)

However, all previously stated actions to the simulator provide significant information in modifying, improving the ergonomic aspects of car interiors. Although Socks discloses virtual hand as the integral feature, Socks however doesn't expressly cover virtual reality simulation by way of displacing sensors throughout the person's body, as describe by Walker et al.

Walker et al discloses a system that integrates a plurality of different groups of sensors for monitoring the movements of a person wearing the data suit. In the preferred embodiment, a first group of sensors generates data to determine body position and orientation of the suit to generally control the position and orientation of an object, or character in a virtual reality scene.

Any movement by the wearer, including wrist, arm and foot movements, generates data indicative of movement. (Walker :column 2, Summary of Invention). All numbered parenthesis reflect data from figure 1 unless otherwise stated.

The data is transmitted to the computer for processing in real time within a virtual reality program. The movement indicating data is continuously processed by the computer so that an object, such as a cartoon figure or character in a virtual reality program, has bodily movements that substantially mimic the movements of the wearer. The data generated by the wearer's movements may be used to control cartoon characters, which impersonate an actor's performance in "real time" or any desired object as determined by the program. The device assisting in funneling the data comprises of three sensors: magnetic body position and orientation sensors; bend sensors and twist sensors. (Walker: columns 3-4)

All three sensors are connected to wires or sensing section which includes a sensor cable coupled to a transducer. This flexible support cable is provided for supporting the sensor cable. The support cable is provided to control flexure to the sensor cable by maintaining the curvature of the sensor along a selected axis and to prevent inadvertent flexure or crimping of the cable. A guide tube (68) is disposed over the support cable (66) and interposed between the cables (66), (64) to allow relative longitudinal movement there between. The guide tube (68) preferably comprises a resilient material, such as extruded nylon, and has a smooth inner surface (70) to allow the support cable (66) to move freely about therein.

The support cable (66) has a diameter of approximately 1/4 inch and preferably comprises a flexible metal alloy, such as brass. (18) The support cable 66 and guide tube (68) are disposed in an opening (72) in the housing (58) and are secured therein to couple the cable (66) and tube 68 to the housing (58). The support cable 66 and guide tube (68) are secured to the housing (58) to prevent the sensing section (56) from detaching from the signal generating section (54). (Walker: Sheet 4 of 6)

Each signal involves an analog-to-digital (A-D) signal converter (154) provides a representative data value for each of the signals generated by the bend sensors (16) and pressure sensors (18). The A-D converter (154) may have an input (156) coupled to the data bus (148) to receive analog signals and have an output (158) coupled to the processor (150)for providing the processor (150) with digital data representing the movement indicating signals. (Walker: 16,18—figure 1; 148,150,154 –figure 10)

Alternatively, the A-D converter (154) may comprise a program stored in the memory device (152) and invoked by the processor, or may comprise a portion of the processor (150) itself (38) After the analog signals are converted to digital values, the data is normalized to provide signals indicating actual movement of the articulations of the wearer (20). The data is normalized to calibrate the bend sensors (16) to accommodate varying ranges of motion, for example, of different wearers of the invented system (10).

The calibration procedure enables the transducers (62) and potentiometer (122) to provide signals to the data unit (142) within a desired arbitrary data range for determining the range of motion of the monitored articulations. (Walker: 38-figure 3; 142,152,154-figure 10; 62-figure 7)

Simultaneously, the data from the position and orientation sensors is received by processing computer for determining the position and orientation of the wearer. The processing computer to generate data indicating the position and orientation of the wearer processes the signals. The data from the data collection unit is fed into a main computer for processing while the position and orientation data is also processed. The data is processed and fed in real time to control the program, such as the virtual reality program, running on the computer. Thus, the plurality of movement indicating sensors of the preferred embodiments of the invented system generate and transmit data indicative of any movements of the wearer. Movements include writs, arm nod foot movements are transmitted to the main computer for processing data generated by the suit in real time. The movement indicating data is continuously processed so that an object, such as a character in a virtual reality program running on the computer, has corresponding real time movements analogous to the movements of the wearer.(Walker: column 5, paragraphs 3 and 4)

One of ordinary skill-level in the art at the time of invention would have modified the teachings of Socks, since it would have been obvious to provide sensors to every part of the body for an improved human representation.

Searching for the roomiest yet safest car interiors is ubiquitous in the automotive industry; therefore obtaining numerous results, in a timely manner, is imperative so as forecast the cost of materials and labor per automotive model, while still focusing on quality. Additionally, the sophistication of sensors Walker's invention discloses a level of detail that supersedes the applicant's discloser of manually changing the size of the person for a software point of view, for example. Although Socks' teachings disclose less than two sensors and uses goggles while Walker teachings are not application specific, both are manipulating the same software. The integration of the two inventions mentioned cover the limitations mentioned in the application.

GROUP I

Claim 1*: A system for subjective evaluation of a vehicle design within a virtual environment using virtual reality comprising: a scaleable physical property representative of the vehicle design, wherein the physical property is adjusted according to a scale ratio for an evaluator of the vehicle design; a computer system for digitally creating a virtual environment having a virtual human immersed within, wherein the virtual environment includes the vehicle design and the virtual human virtually represents a scaled evaluator; a motion capture system for sensing a motion of the evaluator and communicating the sensed motion of the evaluator to the computer system, so that the motion of the evaluator controls the motion of the virtual human in the virtual environment; and a virtual reality display mechanism operatively communicating with the computer system, for providing the evaluator a view of the virtual environment while evaluating the vehicle design.*

(As stated by Socks: column 2, 5th paragraph; and column 3 paragraphs 1-3. As stated by Walker: column 2, paragraph 7; and column 3, paragraphs 1-3)

Claim 2: *The system of claim 1 wherein the motion capture system includes an instrumented glove worn by the evaluator for sensing motion of the evaluator's hand. (As stated by Walker: column 9, lines 1-16)*

Claim 3: *The system of claim 1 wherein the motion capture system includes magnetic spatial tracking sensors located on the evaluator for sensing motion of the evaluator's full body. (As stated by Walker: columns 3-4)*

Claim 4: *The system of claim 1 wherein the virtual reality display mechanism includes a head mounted display mechanism worn by the evaluator for seeing the virtual environment through an eye of the virtual human. (As stated by Socks: Figure 1 and column 5, lines 24-29)*

Claim 5: *The system of claim 1 wherein the computer system includes at least one video terminal displaying a view of the virtual environment as seen through an eye of the virtual human. (As stated by Socks: column 7, lines 23-32)*

Claim 6: The system of claim 1 wherein the computer system includes at least one video terminal displaying a third person view of the virtual human immersed within the virtual environment. *(As stated by Socks: column 7, lines 23-32)*

Claim 7*: A method as set forth in claim 1,wherein the scale ratio is a ratio between a predetermined dimension of the evaluator and a predetermined dimension of a member of a target population. (As stated by Walker: column 4, lines 40-53)*

GROUP II

As to claims 8-14, they recite the same or equivalent limitations and are rejected based upon the same reasoning as claims 1-7,supra.

Claim 8: *A method of subjective evaluation of a vehicle design within a virtual environment using virtual reality, said method comprising the steps of: preparing an evaluator of a vehicle design for immersion as a virtual human in the virtual environment, wherein the virtual environment is created within a computer system and includes the vehicle design; determining a scale ratio for the evaluator, wherein the scale ratio is a ratio between a predetermined dimension of the evaluator and a predetermined dimension of a member of a target population; preparing an adjustable property using the vehicle design and the scale ratio; growing the virtual human within the virtual environment to virtually represent a scaled evaluator; aligning the virtual human in the virtual environment with the evaluator and the property, performing the evaluation of the vehicle design by the evaluator; and using the evaluation of the vehicle design in the design of the vehicle. (As stated by Walker: column 6, lines 42-66. As stated by Socks: column 4, lines 8-38)*

Claim 9: *A method as set forth in claim 8 wherein said step of preparing an evaluator includes the step of measuring an anthropometric dimension of the evaluator. (As stated by Walker: Abstract)*

Claim 10*: A method as set forth in claim 8 wherein said step of preparing an evaluator includes the step of positioning a motion capture system on the evaluator for sensing a motion of the evaluator and communicating the sensed motion of the evaluator to the computer system, so that the motion of the evaluator controls the motion of the virtual human in the virtual environment.(As stated by Walker: column 3, lines 3-19. As stated by Socks: column 3, paragraphs 2-4)*

Claim 11: *A method as set forth in claim 8 wherein said step of preparing an evaluator includes providing the evaluator with a virtual reality display mechanism operatively communicating with the computer system, for providing the evaluator a view of the virtual environment while evaluating the vehicle design. (As stated by Walker: column 3, lines 3-19. As stated by Socks: column 3, paragraphs 2-4)*

Claim 12: *A method as set forth in claim 8 wherein the step of preparing an adjustable property includes the step of determining a scale ratio range for a member of a target population represented in the evaluation and using the scale ratio range to determine adjustability of the property. (As stated by Walker: column 6, lines 42-66.)*

Claim 13: *A method as set forth in claim 8 including the step of determining whether to perform a new evaluation and performing a new evaluation if determined to perform a new evaluation. (As stated by Walker:7-16)*

Claim 14: *A method as set forth in claim 8 wherein said step of growing the virtual human includes the steps of: assuming an initial posture by the evaluator; digitally establishing locations of motion capture sensors positioned on the evaluator in the initial posture using a computer system; creating a virtual human digitally to represent the evaluator using the digital motion capture sensor locations for the virtual human, the evaluator's measurements and the scale ratio; aligning the virtual human with the evaluator, wherein the motion capture sensor locations on the virtual human are aligned with the motion capture sensor locations on the evaluator; and checking that the motion of the virtual human mirrors the motion of the evaluator. (As stated by Walker: column 6, lines 42-66. As stated by Socks: column 4, lines 8-38)*

GROUP III

As to claims 15-20, they recite the same or equivalent limitations and are rejected based upon the same reasoning as claims 8-14,supra.

Claim 15: *A method of subjective evaluation of a vehicle design within a virtual environment using virtual reality, said method comprising the steps of: preparing an adjustable property to represent the vehicle design; measuring the evaluator; positioning a full-body motion capture system on an evaluator for sensing a motion of*

the evaluator and communicating the sensed motion of the evaluator to a computer system, so that the motion of the evaluator controls the motion of the virtual human in the virtual environment; providing the evaluator with a virtual reality display mechanism operatively communicating with the computer system, for providing the evaluator a view of the virtual environment while evaluating the vehicle design determining a scale ratio for the evaluator wherein the scale ratio is a ratio between a predetermined dimension of the evaluator and a predetermined dimension of a member of a target population; adjusting the property using the scale ratio for the evaluator; growing the virtual human in the virtual environment using the measurements of the evaluator and the scale ratio to virtually represent a scaled evaluator; aligning the virtual human in the virtual environment to the evaluator anal the property; performing the evaluation of the vehicle design by the evaluator; and using the *evaluation of the vehicle design in the design of the vehicle. (As stated by Walker: column 6, lines 42-66. As stated by Socks: column 4, lines 8-38)*

Claim 16: *A method as set forth in claim 15, including the step of determining whether to perform a new evaluation and performing a new evaluation if determined to perform a new evaluation. (As stated by Walker: column 11, paragraphs 6-7)*

Claim 17: *A method as set forth in claim 16 including the step of determining whether to use a new evaluator and using a new evaluator if determined to use a new evaluator. (As stated by Walker: column 11, paragraphs 6-7)*

Claim 18: *A method as set forth in claim 17 including the step of determining whether to revise the scale ratio if determined not to use a new evaluator and revising the scale ratio if determined to revise the scale ratio. (As stated by Walker: column 11, paragraphs 6-7)*

Claim 19: *A method as set forth in claim 15 wherein said step of growing the virtual human includes the steps of: assuming an initial posture by the evaluator; digitally establishing locations of motion capture sensors positioned on the evaluator in the initial posture using a computer system; creating a virtual human digitally using the motion capture sensor locations for the virtual human and the scaled measurements of the evaluator; aligning the virtual human with the evaluator, wherein the motion capture sensor locations on the virtual human are aligned with the motion capture sensor locations on the evaluator; and checking that the motion of the virtual human mirrors the motion of the evaluator.(As stated by Walker: column 7, paragraphs 1-7)*

Claim 20: *A method as set: forth in claim 15, including the step of determining a scale ratio range for a member of a target population represented in the evaluation and using the scale ratio range to determine adjustability of the property.(As stated by Walker: column 11, paragraph 6)*

Correspondence Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704.

10. Any inquire of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

September 11 , 2003